

April 5, 2001

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U.S. Environmental Protection Agency
Science Advisory Board Executive Committee
National-Scale Air Toxics Assessment (NATA) Review Panel

Summary Minutes of Public Meeting¹
March 20 & 21, 2001

Committee: National-Scale Air Toxics Assessment (NATA) Review Panel of the U.S. Environmental Protection Agency's Science Advisory Board (SAB) Executive Committee. (See Roster - Attachment A.)

Date and Time: Tuesday, March 20 and Wednesday, March 21, 2000, 8:30 am to 5:15 pm on Tuesday, 8:30 am to 4:30 pm Wednesday (Eastern Time) (See Federal Register Notice - Attachment B).

Location: Radisson Governor's Inn, Interstate 40 at Davis Drive, Exit 280, Research Triangle Park, NC, Room H, 3rd Floor

Purpose: To review and receive technical public comments on the EPA Document entitled "National-Scale Air Toxics Assessment for 1996 (EPA-453/R-01-003)," dated January, 2001. (See Meeting Agenda - Attachment C and Attachment I, NATA Review Document.)

Attendees: NATA Review Panel Members & Consultants (M/C) and SAB Staff: Drs. Small, Anderson (by phone), Bartell, Brown, Chien, Mr. Gentile, Georgopoulos, Greer, Henry, Liu, Mauderly, Middleton and Milford. - all current members were present - see Attachment A); Dr. K. Jack Kooyoomjian (Designated Federal Official - SAB Staff) and Dr. Jack Fowle, SAB Deputy Staff Director.

Agency OAQPS Staff Presenters: Mr. Fred Dimmick, Dr. David Guinnup, Mr. Ted Palma, Ms. Anne Pope, Mr. Joe Touma, Dr. Roy Smith; Other Agency Staff: John Bachmann, Greg Blumenthal, Will Boyes, Rich Cook, Jeneva Craig, Audrey Cummings, Peter Eckhoff, Gary Foley, Nash Gerald, Phil Lu Rang, Carl Mazza, Serageldin Mohamed, Deirdre Murphy, Connie Oldham, Harvey Richmond, Tesh Rao, William Russo, Joe Somers, Michel W. Stevens, Joseph Tikvart, Amy Vasu, Tim Watkins, and Don Whitaker, Allison Wiedeman (See Meeting Sign-In Sheets for other Attendees - Attachment D.)

Members of the Public: Andrew Ballard (BNA - Raleigh, NC), Rebecca Battye (EC/R Inc.), Laura Burrell (American Chemistry Council), Steve Conviser (Honeywell), Alice Crowe (API), Chuck Elkins (Chuck Elkins & Associates), Graham Fitzsimons (EC/R Inc.), Tim French (Engine Manufacturers Assoc.), Steve Gibb (Risk Policy Report), Bill Gullledge (American Chemistry Council), Kyle Isakower (API), Nancy Jones (EC/R Inc.), Norm Morrow (ExxonMobil)

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NOTE: Please note that these minutes represent comments that are individual statements and opinions and are not necessarily consensus comments at this stage of the process in the review of any given topic. In all cases, the final SAB report to the EPA Administrator represents the consensus on the topic.

Chemical), Claudia O'Brien (Latham & Watkins), Debra Phillips (American Chemistry Council), Steve Risotto (HSIA), Lisa Silva (Colorado Dept. of Public Health), Jane Teta (Representing EOIC), Darcy Wilson (ERG, Inc.) (See Meeting Sign-In Sheets for other Attendees - Attachment D.)

Meeting Summary:

The meeting followed the issues and general timing as presented in the meeting Agenda, except where otherwise noted (see Meeting Agenda - Attachment C and Attachment Q for revised agenda for 3/21/01).

I-IV. Welcome and Introductions - Dr. Small, Chairman, opened the meeting at 8:30 a.m. welcoming members and consultants (Roster, Attachment A), and reviewed the meeting agenda (Attachment C). Dr. K. Jack Kooyoomjian, Designated Federal Official for the NATA Review Panel, reviewed the materials which had been provided to the NATA Panel and noted that a complete set of materials was available at the meeting for reference purposes. He reminded panelists that contacts with the Agency or public during the Panel's deliberative phase (i.e., prior to production of a consensus draft report) should involve the DFO to avoid the perception of undue influence. He described the process for completing a final report to be sent to the Administrator, including the production of a public draft, and review and approval by the Executive Committee. Then he requested that panel members introduce themselves and make a voluntary statement as outlined in Attachment H regarding their research interests and experiences related to the review topic. No "particular matter" conflicts of interest were identified.

V. Agency Presentations:

a. Introduction and Overview of the Air Toxics Program: (Presentation by Dr. Dave Guinnup and introduction by Mr. Fred Dimmick, see Attachment L-1): Mr. Dimmick introduced the topic and process of obtaining the emissions inventory, the follow-on process of risk characterization, and the NATA needs for more in the way of cumulative assessments and how this might be improved in the future.

The components of the NATA air toxics program were discussed, as well as the need to cover national, regional, urban and local scale assessments. A full bottom-up characterization of the 33 pollutants under study is not possible at this time; it is a top-down characterization, instead. The current state of information gathering was stressed visually with an analogy of a 40 watt light bulb in a dimly-lit warehouse, showing that a brighter bulb reveals more info, but not a lot of detail. The plan is to repeat the NATA process every three years to improve on the assessment to use better risk assessment tools in the future. The current assessment does not include dioxins and furans.

b. Emissions Inventory & Processing (Presentation by Ms. Anne Pope, see Attachment L-2): Ms. Pope discussed how the compilation and augmentation process worked for development of the 1996 National Toxics Inventory (NTI) for the 32 NATA hazardous air pollutants (HAPs), as well as the Diesel particulate matter (PM) 1996 heavy duty diesel rule inventory. The external reviewer process with the state partners and local agencies was outlined. Brief facts: 47 states provided information; State and local agencies gave

approximately 90 % of the data, which accounted for approximately 50% of the mass emissions; the Toxics Release Inventory (TRI) supplemented this with the 63,000 facilities, which accounted for over 70% of the emissions. The emission inventories are fed into the model pre-processor. The emission value, and not just the emission type, is evaluated in the emissions inventory processing for the Assessment System for Population Exposure Nationwide (ASPEN) model. The five areas of emissions uncertainties in ambient model concentrations were outlined, namely: total mass (speciation of compound classes for grouping), geographic distribution of mass, vertical distribution of mass, chemical/physical characteristics, and temporal resolution, and how OAQPS is improving the 1999 National Toxics Inventory (NTI) and emissions processing.

A Q & A session followed for clarification, since detailed discussions are scheduled for the afternoon session.

- c. Dispersion Modeling & Model-to-Monitor Comparison: Air Quality Modeling and Analysis Component for the Initial National Scale Assessment (Presentation by Mr. Joe Touma, see Attachment L-3): The approach taken for the geographic aggregation of ambient and exposure concentrations generated by the ASPEN and Hazardous Air Pollutant Exposure Model (HAPEM4) was outlined, stressing the limitations of the models, the available emissions data, and the results of the comparisons of ambient predictions with ambient monitoring data. The presentation focused directly on charge question #2. For instance, on ASPEN modeling the focus was on modeling uncertainties such as under-or over-predictions of estimates on emissions, terrain and meteorology, as well as determination of the background value itself.

Currently there is no extensive national monitoring network and only a limited amount of monitoring data. There are no national standards for methods, precision and accuracy, including uneven geographic coverage, as well as variable coverage by pollutant. Representative HAPs were selected for analysis based on available 1996 monitoring data, and data were converted to annual averages to facilitate comparison to ASPEN.

A Q & A session followed for clarification, since detailed discussions are scheduled for the afternoon session.

- d. Inhalation Exposure Modeling: (Presentation by Mr. Ted Palma, see Attachment L-4): Discussions focused on the exposure component for the initial NATA, as well as background on HAPEM which was originally developed by the Office of Transportation and Air Quality, Office of Research and Development (OTAQ/ORD) as HAPEM-MS used for mobile sources. For instance, in HAPEM3, carbon monoxide (CO) was used as a surrogate to predict toxics. HAPEM4 was enhanced by the Office of Air Quality Planning and Standards (OAQPS) and has multiple source category types, 40 demographic groups, as well as various stochastic features for predicting 30 different cohorts each year, and a number of other features.

HAPEM4 is used to predict breathing level concentrations and tracks a cohort (a representative group of people's) movement through time and space. Cohort movements are determined from activity diary data. HAPEM4 tries to characterize normal people, not the tails of the distribution. The HAPEM4 model results were discussed and showed that the HAPEM4 predicted exposure concentrations are generally somewhat lower than the ASPEN ambient predictions. It is noted that most people spend an average of 15 plus hours indoors. HAPEM4

incorporates the inhalation exposure route, applies demographic distributions to exposures, integrates exposure area census tracts, and has a framework in place to predict breathing level concentrations. Also touched on were expected future studies, such as children commuting, longer time period diary studies, allowing a range in air quality within a tract and other enhancements.

A Q & A session followed for clarification, since detailed discussions are scheduled for the afternoon session. Clarification discussions dealt with different exposure scenarios, children commuting with consequent school bus exposures, origin destination studies and related enhancements.

e. Dose-Response Assessment (Presentation by Dr. Roy Smith, see Attachment L-5):

This presentation dealt with how the dose-response assessment fits into the National Scale Assessment, touching on hazard identification, the relationship between average annual exposure and adverse health effects, the dose-response assessment for carcinogens, and the hazard identification for non-carcinogens, as well as various uncertainties, such as in chemical speciation for chromium and nickel, and the interspecies extrapolation for carcinogens and non-carcinogens

f. Risk Characterization (Presentation by Dr. Roy Smith, see Attachment L-5):

He stressed how risk assessment and risk characterization fits into the NATA. The “bottom-up” as contrasted to the “top-down” approach was discussed, along with the correlation coefficients, distribution of ratios from personal to ambient, and bias and range of uncertainty.

LUNCH (11:45 am to 12:40 pm)

VI. Presenting NATA Results to the Public (Discussion by Dr. Dave Guinnup, see Attachment L-6):

The focus was on such questions as conveying risks to the public, caveats to the risk assessment, useful information to the public for community planning and related risk communication topics. For instance, risk communication activities in other Agency offices, and whether there is or should be any Agency-wide activity was discussed. Currently there is no cross-Agency task force, and it has been discussed that the SAB may be a vehicle for risk communication and outreach.

f. Risk Characterization (Continued by Dr. Roy Smith, see Attachment L-5): (See corrected slides).

Discussed were the dose-response data, and “true” potency for data sets versus estimated potency, propagated uncertainty and variability for various gases and particulates, the variability in a reasonable range of risks, components in any future analysis, and the use of expert panels for each area. Key limitations in the risk characterization were touched upon, along with how to achieve the target organ specific hazard index (TOSHI) for respiratory, cardiovascular, blood, liver/kidney, nervous system, and immune system, as well as the distributions of risk.

Important national and regional drivers were touched upon, as well as national and regional contributors. A discussion followed on updates to displays of information to the public, the levels of uncertainties, and the levels of bias on data sets that the Agency needs to

communicate to the public. Also discussed were the order of magnitudes that were selected.

VIII Public Comments:(1:30-2:22) (Refer to Detailed Comments in Attachment N. The following are very brief highlights of the presentations made by the public speakers.):

a. Acrylonitrile Group (Presentation by Mr. Chuck Elkins, see Attachment N-8): Mr Elkins reflected on his experiences in this area, including those experiences serving as Assistant Administrator for the US EPA's Office of Air and Radiation. It was his contention that the uncertainties in that data base are not described very well and that the NATA materials should be the focused to help planners, rather than the public. We still, 15 years later, do not have a toxics inventory, and we have highly variable performance by the states. Acrylonitrile (AN) was based on one County, Jefferson County, Kentucky, that it was double-counted. He was pleased to report that the Agency staff was responsive to correcting this, and that AN is no longer a regional risk driver.

b. Residual Risk Coalition (RRC) (Mr. Chuck Elkins, see Attachments N-2 & N-9): The dose-response data comes from the Integrated Risk Information System (IRIS) data base. This has been a "sweat equity" program over the years. Most of the benchmarks (more than half) are 10 years old, the methods of assessments are changing, the uncertainty factors are changing, and the data in IRIS are not the quality that they have been portrayed. The Agency needs to put money and resources into the IRIS database.

A key scientific issue that needs SAB/NATA attention is whether the methods and data used for NATA are of sufficient quality to support the intended purposes. Also, alternative methods or formats could improve communication of these results.

c. Colorado Air Pollution Control Division (Ms. Lisa J. Silva, see Attachment N-11): She discussed the process, the data from the previous modeling, the massaging of efforts from the previous modeling, and the various communications with EPA to provide information from the states. She believes that the diesel PM could be mis-characterized. The estimates are 2 to 3 times as much, such as from off-road estimates, and she has found that difficult to believe. Diesel PM emissions are not 5 times on-road as they are off-road. She cautioned using such information, especially on a web site.

c. Ethylene Oxide Council (Dr. Jane Teta See Briefing Slides from EOIC, see Attachments N-1, N-5 and N-16): EPA overstates EO emissions and exposure. EPA needs to look to industry for more accurate information. There is a concern regarding the IRIS database being sorely out-of-date for many chemicals. EPA should use updated unit risk estimates (UREs) for ethylene oxide and better state-of-the-art assessments were cited. There are serious overestimates of EO emissions as well as exposures.

d. Engine Manufacturers Association (Mr. Timothy French, see Attachments N-15 and N-17): EPA improperly, and without adequate scientific basis, states that diesel exhaust is one of the air toxics that poses the greatest risk to the public. Further, EPA incorrectly asserts that diesel engine emissions provide a substantial contribution to fine particle emissions. EPA inappropriately uses and reports on the potential cancer risk attributed to diesel exhaust particulates. EPA incorrectly asserts that diesel engine emissions provide a substantial contribution to fine particle emissions, and inappropriately uses and reports on the potential

cancer risk attributed to diesel exhaust particulates.

e. Halogenated Solvents Industry Alliance, Inc. (Mr. Stephen P. Risotto, Executive Director, HSIA, see Attachments N-3 and N-18): Quantitative risk estimates are not provided in IRIS. HSIA believes that use of CalEPA factors will create inconsistency with ongoing reviews of air toxics, such as perchloroethylene. Agree that the potency factor currently being developed in revisions to the IRIS data base for perchloroethylene may be more appropriate for NATA, and while the potency factor developed by CalEPA for trichloroethylene is comparable to that developed by the federal EPA, the potency factor for perchloroethylene differs by an order of magnitude.

f. Hydrazine Panel of the American Chemistry Council (Ms. Claudia O'Brien of Latham & Watkins, see Attachments N-6 and N-12): The main point here was that they wish to have the SAB direct EPA to re-run the risk assessment for hydrazine to correct significant errors in the emissions inventory, and therefore the risk estimates. These errors in the case of hydrazine account for almost 75% of the total emissions inventory.

g. International Truck and Engine Corporation (Ms. Claudia O'Brien of Latham & Watkins, see Attachments N-4 and N-14): Diesel exhaust should not be included in the NATA report. She used a Sesame Street analogy and concluded that "it's 32 trees and a cupcake! Diesel simply doesn't belong!" Diesel exhaust should be removed entirely from the draft assessments, because diesel is not a HAP, and because of the lack of a unit risk factor (URF) makes a risk assessment of diesel exhaust infeasible. At a minimum, the discussion of diesel exhaust in the draft assessment needs to be modified.

h. U.S. Army, Ft. Detrick, MD (Dr. Robert J. Carton, Chief of Environmental Protection, U.S. Army Medical Research & Materiel Command, Fort Dietrick, MD, see Attachment N-7): - Written comments only. Not present at meeting. Points made are that Hydrogen Fluoride (HF) is second most prevalent toxic emission and would seem to be important.

i. Amy D. Kyle: Univ of Calif, Berkeley (see Attachment N-10): - Written comments only. Not present at meeting. Points made are that it might be worthwhile to consider attempting to improve the quality and comparability of the emissions data and to speed the process. Comparisons of the modeled data to monitored data presented in the NATA document suggest that the emissions inventories are missing important sources. For instance, predictions for cadmium and chromium are low compared to measured values, and it is reasonable to conclude that important sources are missing. Estimates for the most affected areas are needed. Need to look at persistent bioaccumulative pollutants. Dioxin should be included. Concern raised pertaining to adequate benchmarks and risk estimates.

PUBLIC COMMENTS WERE CLOSED AT 2:22 pm.

VII Discussion of ORD Research on the Air Toxics Area (Presentation by Dr. Chon Shoaf, see Attachment L-7): This discussion touched briefly on research on emissions, exposure, dose to target tissue, health effects, risk characterization (such as nasal uptake and cross-route dosimetry, benchmark dose, acute reference exposure, and analysis of uncertainty and variability) and ORD collaborative research. Groups involved in collaborative research included Science to Achieve Results (STAR), the Health Effects Institute, the National Jewish and Medical

Research Center, the Lovelace Biomedical and Environmental Research Institute and others. Discussion of topics included the core research areas, the IRIS data base, mobile toxics, mobile source testing in the oxygenation program, indoor air pollutants and others.

A Q&A session followed on identifying the data gaps and funding research in these areas. A summary chart showing \$12.2 million in the FY-01 budget by categories was displayed which shows funding and FTEs. How the NATA document might influence and inform the research process was discussed. Discussion occurred on Models 3 and whether this is ready for prime time. For air toxics, the plans are that over the next 6 years, it is expected that it will be expanded to add perhaps 6 haps.

BREAK 2:45-3:00

IX Consideration of the Charge Questions:

Dr. Small requested the written materials to be passed out to the panel members. Also, the written materials were made available to the public, with the caveat that they are very preliminary draft comments of the individuals on the panel and do not at this time represent consensus views of the NATA Review Panel.

Q. #1 Given the nature of the National Toxics Inventory (NTI) and the methods by which it was developed and reviewed, have the available emissions data been appropriately adapted for use in this assessment? Can the panel suggest improvements to EPA's application of the NTI for use in future initial national-scale assessments? (Dr. Chien and Mr. Gentile)

Dr. Chien and Mr. Gentile gave an overview on this charge question and their findings at the present time. Issues cited include the vintage of the data has cause for some concern. Also some questions on the reactive decay of the pollutants were raised with the staff. Temporal allocations of emissions were discussed. Was the on-road and off-road fluctuation captured in the HAPTEM model? The staff answered that, it was captured in the ASPEN model, and as well in the HAPTEM model.

EPA has not undertaken a full-scale evaluation of the state data and there is a question of what kind of data is provided, how complete are the data, and the quality of the data from the 48 of the 50 states. Issues such as speciation of the data are important. The Agency noted that the number of pollutants and coverage in each state is available in the CD-ROMs, which provides a qualitative review. The Agency has requested various data fields, but some of these are not required, and the burden on states and industry are increased. The models-to-monitor comparisons are ongoing and that this may help the states understand why gathering such data would be helpful. The Agency staff acknowledged the helpful activities with various industry groups.

Discussion touched on the over and under-estimates and that SIC codes might help improve the estimates from various census tract data. The Agency staff noted that some of the states have actually calculated individual metal species, individual co-genitors, and have assisted in better estimates. Assignments of spatial surrogates to the census tracts appear to not have believable estimates from some of the state data. Analysis at the County level or higher is more appropriate than getting into smaller areas. Terrain and meteorological

conditions are additional factors.

The Agency staff acknowledged that the first time through, the toxics inventory is quite variable and that the Agency is hopeful that with further dialogue with the states and the industry, the emissions inventory will be greatly improved.

The Panel members and consultants observed that in some tables (e.g., Table 4-4) the emissions are over-estimates, but in other tables, they are under-estimated. The model is under-predicting where there is monitoring data. It was acknowledged that there are large underestimates for the metals, and it was thought that this may be due to how metals are reported and that this should be explained. The panelists noted the difficulty of models-to-monitor comparisons, asked if the Agency has exhausted the possibilities, and suggested that they go to different sources to provide checks on emissions.

Q. #2 Is the approach taken for the geographic aggregation of ambient and exposure concentrations generated by the ASPEN and HAPEM4 models appropriate in the light of the limitations of the models and the available emissions data and in comparison with predictions of ambient monitoring data? (Drs. Georgopoulos, Middleton & Gentile)

The short answer is “yes & no.” ASPEN and HAPEM4 involve a set of 33 quite diverse contaminants. Several examples were discussed, e.g, benzene is okay, but 9 of the contaminants have significant discrepancies from what a model would predict from linear decay and some of these HAPs have non-linear decay patterns. The explicit caveats on the limitations throughout the report are very helpful. Census tract information makes a lot of sense to use. The mesoscale rather than national scale character of ASPEN allows for independent local evaluation and refinement of estimates. It is understood that NATA is/will be a work in progress and that refinements will be taking place. It is always easy to criticize than create. The concerns regarding ASPEN were outlined.

Seasonal differences were discussed, such as ambient temperatures, lawnmowers in May thru July and not in January where there may be snowblowers, etc. A possible solution is to perform seasonal ASPEN and emissions preprocessing runs. A number of other suggestions were offered. The panelists noted the excellent job the NATA group had done in citing and listing limitations. It was suggested that listing some caveats and noting where ASPEN might work better or not would be helpful.

There was agreement among the panelists with Dr. Georgopoulos’ comments on the ASPEN model, including use of HAPEM in future assessments, but perhaps they should be left out of this round.

Some of the NATA Panelists observed that for the underestimates of concentrations for some stable gases, the model predictions may be reasonable, but for unstable gases it poses some problems. In order to deal with this problem, there is a need to evaluate the model itself and test the model limitations in other cities or communities. Suggestions were made to include the Los Angeles Basin and to work with CalEPA, since they have a lot of data. A number of suggestions were offered, and it was also cautioned that to be careful in choosing the default values.

It was observed that the glaring problem with HAPEM is that the indoor exposure is quite significant and that it is quite a mismatch to marry HAPEM to the total results. The Panelists suggested identifying what we know or don't know. For instance benzene has a population-based dose model and for which we have a lot of information, and where we could use this as a "gold standard." The Panelists agreed that the indoor sources need to be accounted for. The documentation of HAPEM probably should not be put through the same level of scrutiny as models that have been around 25 years or more, but it needs to have more explicit caveats on the model use.

Dr. Small offered the Agency to respond to clarify points raised. The Agency staff noted how some of the constructs were developed and how it compares to practices

Q. #3 Has available dose-response information (e.g., different sources of information, a different prioritization scheme) been appropriately used in this assessment? Can the Panel suggest methods that could improve upon the use of available dose-response information? (Drs. Brown & Bartell)

The Panelists engaged in a discussion and overview of the state process, noting that the states approach this issue in the same manner with the peer review process. It was stressed that we should not confuse the uncertainty in the NATA process, with uncertainty in the data, and that we need to look at ground-truth the data. For instance, extrapolation to the oral dose from the inhalation dose introduces uncertainties. Also, if we consider interactions, we go quite far from where we want to go. Need to understand the NATA variability in the estimates, and need to avoid a failure of NATA in underestimating serious risk, such as with mercury. The TOSHI approach may be helpful, but may be pushing the science a little far. The intuitive stochastic process and the risk communication message needs to be refined.

The Panel acknowledged the information on ethylene oxide, and noted that it will greatly contribute to a more thoughtful answer. Previous SAB reports will need to be examined to check some of the previous recommendations and findings and thoughtful insights that were offered before. A concern was expressed that something might take on the appearances of a mathematical and statistical rigor that just isn't there at the present time.

Q. #4 What are the strengths and the weaknesses of the overall conceptual approach to risk characterization used in this assessment? Given the underlying science and the intended purposes of the assessment, can the Panel suggest ways in which the risk characterization could be improved? (Drs. Greer, Henry & Liu)

The Panelists observed that the conceptual approach is a really good effort overall. In that spirit, there should be some tolerance for more errors in a beginning data base tool, but there also are problems with the language and terminology in the model. The Panelists suggested more acceptable language to properly characterize uncertainty. It was further suggested that that the Agency might as well say something more useful about the data, such as the obvious use of the County-level data. Also, the Agency could frankly note that HAPEM brought much more confusion and error than it brought help to us. The language is not as balanced as it could be in characterizing risks for the public. People in the environmental community feel that there has been as serious rollback on pollutants. An example was offered of butadiene, which has "fallen off the radar screen." It was thought that there would be a very

big difference with the public if it were treated with clear logic regarding the reason that butadiene fell off the track. Need to explain changes in simplified ways to have people understand. This is a tremendously helpful effort for understanding by the public.

It was noted that some method is needed to keep the process going and to understand where the critical elements are, as well as what are the uncertainties and limitations in the NATA process, and what does it mean at the census tract level. Some Panelists believed that it will not work at the census tract level, but the County level may be better.

The Panelists discussed data variability for acute effects, which was felt to be more difficult than the dispersion and exposure model issues. The direction of bias is also important. For instance some pollutants may be over or under-counted, over or under-reported, and there may be different biases across sources. It was suggested that the Agency needs to evaluate the sizes and directions of the bias in order to add them together.

The Agency staff noted positively that identification of the errors in the emissions estimates is very helpful and that they would like some feedback as to when the comments can move to the 1999 inventory, and that a "wrap up" could occur for the 1996 inventory commentary.

Dr. Small stressed that the teams should get together for breakfast and to agree on 2 or 3 main points to see in the Executive Summary of the report. He indicated that tomorrow's discussion will start with charge question #5 on diesel. The Panelists will be getting together in their respective groups at 7:30 am for breakfast and have a "working breakfast" on the charge questions.

ADJOURN: 5:45 pm

Day #2: Reconvening: 3/21/01 at 8:30 am : Dr. Small welcomed everyone and he outlined the expected schedule for the day, noting the main points that need to be accomplished.(See revised Agenda, Attachment Q). He then handed the discussion for Charge Question #5 over to Dr. Mauderly.

Q. #5 Although EPA has concluded that available data are not sufficient to develop a reliable quantitative estimate of cancer risk for diesel emissions, it is clear that this pollutant class may be of significant concern in a number of urban settings. The risk characterization in this report includes a discussion of diesel particulate matter to help states and local areas frame the importance of this pollutant compared to the other air toxics. In the context of this assessment, is the discussion in this report regarding making risk comparisons among other air toxics appropriate? Can you provide any suggestions that would improve upon this approach to comparing the toxic health effects of diesel particulate matter with other pollutants? (Drs. Mauderly & Small)

Briefly stated, exposure assessment gets a nod, but diesel can't be dealt with like other materials. It seems incongruous to have a parallel diesel discussion in each chapter. It need not be a separate chapter. The CalEPA Number is accepted outside of California as the stated number, and there are people outside of California that use the number.

Dr. Small allowed EPA to clarify. The Agency staff provided clarification on how diesel was ranked in a different way. The Agency's message to the states is that diesel is one of the pollutants which merits some special treatment. Perhaps we (the Agency) mis-stated that it is the greatest risk.

Q. #6 Given the limitations inherent in this preliminary assessment, have uncertainty and variability been appropriately characterized?.... (Drs. Milford and Small)

The Panelists observed that the estimates are generally on the conservative side, but we have numbers on the low side that also need to be looked at. There were a lot of "apples to oranges" comparisons, and a number of specific suggestions were offered.

The stages of models from simple to complex were recognized. It was suggested that the emissions would be better off to look at select scenarios, the different state reports, as well as the scenarios dealing with fate to transport. Need to look clearly at inaccuracy versus precision, and need to focus on the inaccuracies first, rather than the uncertainties of precision. There might be a reasonable variance-induced way for individuals, but not for a distribution. Key scenarios focusing on uncertainties and showing current debates might be helpful. It was suggested that Figs 5-9 thru 5-21 should be deleted.

It was suggested that the conceptual display colors (e.g., green, yellow, red) on the models be used to depict degree of uncertainty, but if there were columns to show bias effects, that would be helpful as well. Columns were useful to examine the description, but it might not be appropriate for the public. Some sort of bounding estimates might be helpful, but need a scenario-based approach rather than a Monte-Carlo simulation.

The Panelists also discussed modeling and uncertainty, as well as default values, suggesting that a more quantitative manner to define the parameters would be helpful. The way pollutants are defined was also cited as important, such as with the indoor air component.

The Panelists enquired whether running the California numbers would be helpful to see what the results are, noting that this could fit into Dr. Small's recommendations for the scenario analysis approach, and to have concentration (hi lo) and dose factors (hi lo) that can be looked at.

The Panelists noted issues with the Ozone and PM correlations. The Agency clarified that EPA is interested in indoor air and that a linear regression is used to develop the outdoor source term. There may be something the Agency can do on the exposure side to get a longitudinal cohort, as well as understand how pollutants vary across the census tracts. The exposure model showed only 10% to 15 % variability, and the Agency believes that it is considerably larger than that. The micro-environmental penetration factors are derived in a reasonable manner, but the Agency simply does not have the quantification to do the NATA at this point in time.

It was suggested that there may be data in schools that would make the child exposure estimates more significant. A discussion followed on a number of suggestions on characterizing uncertainty and variability.

Q. #7 Have the results from the assessment been appropriately and clearly presented? Can you suggest alternative methods or formats that could improve the presentation and communication of these results? (Dr. Anderson & Dr. Small)

It was underscored who is going to use this document and that the qualitative characterization is just as important as the quantitative issues. A great deal of the work will go on at the state level, and users would look to this document for making decisions on additional monitoring methods. A key item is what logically are the components. The color coding concept was well received by the Panelists. It was suggested that this could be used in the web page as a qualitative assessment tool, and the table, charts and graphs might be tailored accordingly on the web page. There is a lot that can be done with qualitative comparisons. The positive components of uncertainties would be to express the qualitative degree of confidence, and a confidence interval issue may be expressed in a meaningful component. The smaller geographic areas may want to address monitoring issues, for instance. It is also helpful to look at the other web sites available; California has a good one, for instance.

The Panelists observed that it is helpful to have yardsticks up front and that it will be very important to recognize the limitations on uncertainties, and to recognize that the magnitudes on uncertainties do not change the rankings very much. The color coding and the other formats should be compatible. The Panelists observed that we hadn't adequately noted the differences in risks between adults and children, and until it is adequately worked out, it probably should not be included.

The Panelists commented positively on the visualization maps, but noted that we have to be careful on the adequacy of the substance being provided on the maps. The Panelists cited the need for maps, with the caveats, as well as conveying the correct representation of the risks. For instance, some of the cancer estimates, and the deaths from combined GI and respiratory causes: Are air toxics responsible for all of them, 1/10 of them? Some bounding is needed to convey such concepts to the public. Because it is a tough question, we tend to ignore it, and it is no greater stretch to try to put some bounds on the values.

Trying to address all cancer is important and it would be helpful for the Agency to cast the data into a context that means something at a personal level. It was observed that most people will be looking at the data to answer a personal question.

The Agency staff are very much interested in the advice that may be conveyed by the NATA Panel and asked for clear recommendations. For instance, should we be counting the incidents that occur? The individual focuses on the risk in a personal context. There is a need to highlight and characterize the imprecision, that the actual distribution varies across the states, and that the Agency should not use a number that inadequately expresses risks. There is a need for concerned people to receive meaningful information.

Some of the Panelists expressed the thought that we might be going way beyond the scope of coverage of the original document and that we might be coming up with an endless list for the Agency to address. We may need to focus on what it would take to complete the 1996 assessment. The issue to try to personalize the risk assessment and characterization process may take an enormous amount of time. The various improvements suggested by the Panelists might be appropriate in future versions of NATA.

The Panelists noted that personal experience with stakeholder groups suggests that we have to be very clear on the accuracy and precision of data, and the Agency may need more justification of the particular cohorts chosen.

There was a sense of the Panelists that we should move forward on the 1996 assessment, and to apply many of the suggestions to future assessments.

Q. #8 The exposure methodology in NATA is being considered as one candidate for providing the basis for a national-scale benefits analysis (as required in Section 812 of the CAAA). Please comment on the strengths and weaknesses of this approach, recognizing the limitations outlined in the NATA report? (Everyone)

The short answer is “no,” to mean, “no, not yet.” It can feed into the newer Prospective studies. The Panelists noted that it is not in the current report or Appendices and it is better to not say much right now, because it is not there yet.

The Panelists observed that the exposure methodology needs to cover asthmas, that we need to do a better examination on exposures, and that it should be incorporated into improvements in the future assessments.

The residual risk is reasonable, but the Agency should state what is needed to do the next round of iterations to improve the calculations and estimates. One Panelist remarked that he has never seen a body count that he likes, or is comfortable with, and proposed that bounding the class of pollutant is a very helpful approach. Exposures should reflect real-life scenarios, and the Agency should try to simulate the real distribution, examine the exposure points, as well as chronic exposure, urban versus rural exposures, the scope of the risks, and related topics.

10:35 -11:00 BREAK

11:00am- 2:28pm Noon Key Point Easel Writing (Like a Poster Session) and Key Point Discussion:

11:50 am Dr. Calvin Chien commented on Dr. Small's recent honor and appointment the John Heinz Professor at CMU. This is an endowed Professorship.

He also noted the recent appointment as Duke Chair Professor at UNC Charlotte for Dr. Hillary Inyang.

NOTE: The NATA panelists assembled in groups to formulate the key points to be raised in the Executive Summary of the SAB NATA report. The groups wrote their key points on poster (easel) paper for each of the nine charge questions. The groups then taped the posters and presented their logic to everyone present. The individual presenters added or supplemented the comments made by the lead presenter. Other NATA Panelists commented as appropriate on the key points. This was run like a poster session, with the panelists standing around each poster and engaging in dialogue. In the process, the NATA Panelists commented until the discussion was concluded by all. This process ran from 11:00 am to 2:28 pm, with a lunch break from 12:40 to 1:30 pm.

The lead presenters were as follows on each of the Charge Questions:

| | |
|--------------------------------------|--|
| Q. #1: For Future NATA Improvements: | Thomas Gentile |
| Q. #2: ASPEN & HAPEM4: | Paulette Middleton |
| Q. #3: Dose-Response Info.: | David Brown |
| Q. #4: Risk Characterization: | Carol Henry |
| Q. #5: Diesel: | Joseph Mauderly |
| Q. #6: Uncertainty: | Mitchell Small |
| Q. #7: Communication: | Henry Anderson with Mitchell Small |
| Q. #8: Benefits Analysis: | Paulette Middleton |
| Q. #9: Future Research: | Paulette Middleton with contributions by Brown, Chien, Gentile, Georgopoulos, Milford, and Small |

The discussion on charge Question #9 on Future Research Priorities (Do you have suggestions for research priorities that would improve such air toxics assessments in the future? Everyone) - This was incorporated into the easel/poster session points, rather than in the earlier discussion.

2:28-3:45 Writing Time and Reading Time/Feedback and Discussion Amongst NATA Panelists for Completion of Report: The NATA Panelists assembled into their assigned groups to refine their responses to the individual charge questions and provided their electronic files for merging into the draft report outline.

Discussion Amongst NATA Panelists for Completion of Report: The NATA panelists coordinated amongst themselves with regard to any additional writing assignments and refinements to their existing written text.

3:45-3:55 Feedback to Agency (De-Briefing): Since the some of the Agency staff stayed for the poster session discussions on the nine Charge Questions, there was no need to conduct a formal de-briefing. A request was made by one of the attendees to discuss the details of Charge Question #9 on Recommendations for Future Research. Dr. Small asked Dr. Kooyoomjian to give the overview from the summary notes. There was a discussion of the research recommendations, with Dr. Carol Henry adding several additional points such as enhancing longitudinal cohorts, instead of just using a daily-time inventory for personal exposure modeling. The details of the recommendations will appear in the report.

3:55-4:05 Summary of Remaining Activities, and Schedule as Well as “Overflow” and Remaining Items: Dr. Mauderly asked a procedural question, noting that it is the usual practice that the CASAC appends all comments generated by members and consultants at the public meeting to the back of the CASAC report. Dr Small advised that the NATA Panel report will be developed by re-writing and merging the individual comments into a consensus draft, and that the members and consultants will need to review, concur or modify the language in the draft report so that a consensus report is developed. He noted that individual comments would therefore be merged into the report.

Dr. Small asked Dr. Kooyoomjian to outline the schedule for the remaining activities. The target date is to complete a consensus draft by the end of April, so

that it can be forwarded to the SAB Executive Committee (EC) for review and approval. Dr. Kooyoomjian briefly described the SAB EC vetting process. It was noted that the public could comment at the SAB EC public meeting.

The following dates were proposed:

| | |
|------|---|
| 4/4 | Dr. Small to e-mail draft report for review to NATA Panel |
| 4/16 | Comments due from NATA Panel to Small & Kooyoomjian |
| 4/19 | Re-written Report to Panel for Public Conference Call meeting |
| 4/24 | Public Conference Call Meeting 11:00 am to 2:00pm, with the public portion of call being advertized for 11:00 am thru 1:00 pm eastern time. This would likely be an editing session where public comments would not be solicited. |

A request was made by a NATA Panel member (Dr. Henry) to send the tentative schedule to the NATA Panel so everyone would strive to adhere to the scheduled dates.

4:05pm ADJOURN - There being no additional business to conduct, Dr. Small moved to adjourn the meeting at 4:05 pm.

Action items:

- 1) Dr. Kooyoomjian to set up the April 24, 2001 Conference Call
- 2) Provide Dr. Paulette Middleton's suggested excerpts of CAAA Sec 812 background materials to the NATA Panel
- 3) Dr. Small asked Dr. Kooyoomjian to contact Dr. Paulette Middleton to take lead on Charge Question #8 edits.
- 4) Dr. Small will prepare the NATA second draft report for review (the first draft was a compendium of individual comments assembled at the meeting and provided to Dr. Small by Dr. Fowle in electronic form). This second draft will be e-mailed by Dr. Small to the panelists on April 4th as the target date.
- 5) All NATA Panelists should e-mail Dr. Small any further refinements to their write-ups the week of March 26th.

The above is certified to be accurate and representative of the major accomplishments.

Respectfully Submitted:

Certified as True:

K. Jack Kooyoomjian

Mitchell Small, Chair

Designated Federal Official

National-Scale Air Toxics Assessment
(NATA) Review Panel

List of Attachments

| <u>Attachment</u> | <u>Description</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|---|------------------|---------------------------------|------------------|-----|---|---------|-----|---|---------|-----|-------------------------------------|---------|-----|--------------------------------------|---------|-----|--------------------------------|--------|-----|--|---------|-----|--|----------|-----|---|---------|
| A. | NATA Review Panel Roster | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Federal Register Notice, Vol. 66, Number 29, February 12, 2001, pages 9846-9847 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | Meeting Agenda dated March 15, 2001 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | Meeting Sign-In Sheets | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Charge to the NATA Review Panel (sab-charge2801.wpd) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | NATA Charge and Proposed Discussants (charge discussants.wpd) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | Cross-Walk for Charge Questions and "NATA National-Scale Air Toxics Assessment for 1996" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | Policy for Public Disclosure at SAB meetings | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I | NATA Review package, dated January 25, 2001 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| J | Minutes of Feb. 21, 2001 Conference Call | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | SAB Proposed Project Sheet on National Air Toxics Assessment (NATA) 1996 National-Scale Assessment, Sept. 25, 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | <u>Agency Presentation Materials:</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-1 | The National Air Toxics Assessment - Overview by David E. Guinnup, 3/20/01 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-2 | The National Air Toxics Assessment - Emissions Inventory Development & Processing for the Initial National Scale Assessment by Anne Pope, 3/20/01 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-3 | National Scale Air toxics Assessment - Air Quality Modeling and Analysis Component for the Initial National Scale Assessment - Joe Touma, 3/20/01 (Also addresses Charge Question #2) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-4 | The National Air Toxics Assessment - Exposure Component for the initial National Scale Assessment by Ted Palma, 3/20/01 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-5 | The National Air Toxics Assessment - Risk Characterization by Roy L. Smith, 3/20/01 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-6 | The National Air Toxics Assessment - Presenting NATA Results to the Public by Dave Guinnup | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L-7 | The National Air Toxics Assessment - ORD Air Toxics Research by Chon Shoaf, ORD | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M | <u>Member/Consultant Pre-Meeting and Meeting Written Materials:</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M-1 | NATA CHARGE (3/15/01) - This identifies the charge questions 1-9 and who has been assigned to write materials | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table><tr><th><u>DATE</u></th><th><u>COMMENTER & MATERIAL</u></th><th><u>NO. PAGES</u></th></tr><tr><td>M-2</td><td>3/10/01 Dr. Henry A. Anderson (anderson1.wpd)</td><td>2 pages</td></tr><tr><td>M-3</td><td>3/12/01 Dr. S.M. Bartell (bartell1.wpd)</td><td>4 pages</td></tr><tr><td>M-4</td><td>3/15/01 Dr. Kai-Shen Liu (liu1.wpd)</td><td>3 pages</td></tr><tr><td>M-5</td><td>3/16/01 Dr. Linda Greer (greer1.wpd)</td><td>8 pages</td></tr><tr><td>M-6</td><td>3/16/01 Dr. Paulette Middleton</td><td>1 page</td></tr><tr><td>M-7</td><td>3/18/01 Dr. David R. Brown (Dbrown1.wpd.doc)</td><td>7 pages</td></tr><tr><td>M-8</td><td>3/19/01 Mr. Thomas Gentile (TGentile2.wpd)</td><td>11 pages</td></tr><tr><td>M-9</td><td>3/19/01 Dr. Carol J. Henry (Henry1.wpd)</td><td>9 pages</td></tr></table> | <u>DATE</u> | <u>COMMENTER & MATERIAL</u> | <u>NO. PAGES</u> | M-2 | 3/10/01 Dr. Henry A. Anderson (anderson1.wpd) | 2 pages | M-3 | 3/12/01 Dr. S.M. Bartell (bartell1.wpd) | 4 pages | M-4 | 3/15/01 Dr. Kai-Shen Liu (liu1.wpd) | 3 pages | M-5 | 3/16/01 Dr. Linda Greer (greer1.wpd) | 8 pages | M-6 | 3/16/01 Dr. Paulette Middleton | 1 page | M-7 | 3/18/01 Dr. David R. Brown (Dbrown1.wpd.doc) | 7 pages | M-8 | 3/19/01 Mr. Thomas Gentile (TGentile2.wpd) | 11 pages | M-9 | 3/19/01 Dr. Carol J. Henry (Henry1.wpd) | 9 pages |
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| M-10 | undated | Dr. Calvin Chien (Chien3.wpd) | 2 pages |
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List of Attachments Continued

| <u>Attachment</u> | <u>Description</u> | | |
|-------------------|---|-------------------------------|--|
| M | <u>Member/Consultant Pre-Meeting and Meeting Written Materials: Cont'd:</u> | | |
| M-11 | undated | Dr. J. Milford (Milford1.wpd) | 2 pages |
| M-12 | 3/21/01 | Dr. Kai-Shen Liu (4 pages) | 4 pages |
| M-13 | 3/21/01 | Drs. Brown/Bartell edits | 4 pages |
| N | <u>Public Comments:</u> | | |
| | <u>Date</u> | <u>Type of Correspond.</u> | <u>Organization</u> <u>Description</u> |
| N-1 | 2/15/01 | E-mail memo | Ethylene Oxide Industry Council of Hamilton From Sara D. Schotland Cleary Gottlieb Steen & (EOIC) |
| N-2 | 2/15/01 | E-mail Letter | Residual Risk Coalition (RRC) From Alice Crowe of API for RRC |
| N-3 | 2/20/01 | E-mail memo | Halogenated Solvents Industry Alliance, Inc. (HSIA) From Paul Dugard, Ph.D. Dir. of Scientific Programs |
| N-4 | 2-26/01 | Fax letter | International Truck and Engine Corp. From Claudia M. O'Brien of Latham & Watkins requesting time to speak at the SAB NATA meeting 3/20 to 3/21/01 |
| N-5 | 3/5/01 | | EOIC of the American Chemistry Council (ACC) From Courtney M. Price, V. President, CHEMSTAR |
| N-6 | 3/6/01 | Letter | Hydrazine Panel of ACC From Claudia M. O'Brien of Latham & Watkins |
| N-7 | 3/6 & 3/7/01 | E-mails | Dr. Robert J. Carton Written comments pertaining to Hydrogen Fluoride (HF) |
| N-8 | 3/12 | Letter | Acrylonitrile Group (AN) John F. Murray, CAE Executive Director comments on AN |
| N-9 | 3/12/01 | Letter with Appendices | Residual Risk Coalition From Alice Crowe For the RRC |
| N-10 | 3/14/01 | E-mail Ltr. | Univ. of CA, Berkeley Comments on NATA from Dr. Amy D. Kyle, Ph.D., MPH |
| N-11 | 3/14/01 | E-mail Ltr. | Colorado Air Pollution Control Division Comments from Lisa J. Silva Air Quality Planner |
| N-12 | 3/15/01 | E-mail | Hydrazine Panel Comments from Stacy Wallick for Hydrazine Panel |

| | | | |
|------|---------------------------------|--|--|
| N-13 | 3/15/01 Letter with Attachments | ACS | Courtney M. Price, Vice. Pres., CHEMSTAR |
| N-14 | 3/16/01 Letter with Attachments | International Truck and Engine Corporation | William Bunn, M.D., MPH, J.D., Vice President of Health & Safety Navistar Int'l. Transp. Corp. |

List of Attachments Continued

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| | <u>Date</u> | <u>Type of Correspond.</u> | <u>Organization</u> |
| N-15 | 3/16/01 | | Engine |
| | | | Manufacturer's Assoc. (EMA) |
| N-16 | 3/20/01 | | EOIC Presentation Slides |
| N-17 | 3/20/01 | | Briefing Slides |
| | | | Presented by Ms. Claudia O'Brien |
| N-18 | 3/20/01 | | Comments by HSIA |
| | | | Cover Sheet with 2/8/01 Letter to Sally L. Shaver, EPA, Including Appendix HAP Profiles |
| O | SAB Reports for Background on NATA Topic and Charge Questions: | | |
| | <u>Report Number</u> | | <u>Short Description</u> |
| | EPA-SAB-EEC-89-012 | | Modeling Resolution |
| | EPA-SAB-IHEC-ADV-96-004 | IHEC | Cumulative Exposure |
| | EPA-SAB-EC-ADV-99-009 | | Charter on CREM |
| | EPA-SAB-EC-ADV-99-011 (?) | | |
| | EPA-SAB-COUNCIL-ADV-99-013 | | CAAA 812 Prospective |
| | | | AQMS Advisory |
| | EPA-SAB-COUNCIL-ADV-00-001 | | CAAA 812 Prospective HEES |
| | | | Advisory |
| | EPA-SAB-COUNCIL-ADV-00-002 | | CAAA 812 Prospective |
| | EPA-SAB-COUNCIL-ADV-00-003 | | CAAA 812 Prospective |
| | EPA-SAB-EC-00-015 | | Air Toxics Monitoring Strategy |
| P | EPA Science Policy Council Handbook on Risk Characterization, EPA-100-B-00-002, December, 2000 | | |
| Q | Revised Agenda for 3/21/01 | | |
| R | Mark-up of Agenda | | |

End of Record